sulated meningitis and brain abscess, 4 were sinus thrombosis and brain abscess, 5 were tubercular meningitis, 6 were cases of intracranial pressure presenting meningeal symptoms.

Twenty-nine times the puncture gave normal fluid (negative result). Of these, 7 were in cases of sinus thrombosis, 3 were in perisinous abscess, 7 were in brain abscess, 5 were in sinus thrombosis with brain abscess, and 7 were in cases of intracranial pressure with meningeal symptoms. On the other hand, in those cases where a general purulent meningitis existed, either alone or as a complication, the cerebro-spinal fluid showed the above-described abnormal conditions. The cases of cerebro-spinal meningitis and meningitis serosa reported are so few in number that the conclusions drawn from them have little worth.

As to the tubercular meningitis, Braunstein believes that the opalescent cloudiness of the fluid gives a fair presumption that the intracranial trouble is meningitis tuberculosa, even when the microscopical examination fails to show the presence of the tubercle bacillus.

As to the diagnostic worth of lumbar puncture in intracranial complications of otitic diseases, Braunstein concludes:

1. Obtaining by lumbar puncture normal cerebro-spinal fluid, when from its amount you can conclude that a part comes from within the cranium, rules out with great certainty a general purulent meningitis.

2. Obtaining by lumbar puncture cerebro-spinal fluid which presents the above-described abnormal characteristics proves the presence of a diffuse purulent meningitis.

On the Pathology of Deaf-mutism and the Window Niches.—Prof. J. Habermann, of Gratz, divides deaf-mutes into two classes, hereditary and acquired. The percentage of each varies with different writers. Uchermann found in 1885 about 1841 deaf-mutes in Norway, of whom 51 per cent. were heredity, and the remaining per cent. were acquired, with the exception of 0.5 per cent., in whom it could not be determined. It is not always possible to determine, even by examination after death. Most cases of acquired deaf-mutism are caused by diseases of the labyrinth, most of which have spread from the brain or middle ear. Mygind, in his work in 1894, reported over 139 cases in which the middle ear only was diseased, but he stated nothing about the labyrinth or the histological examination of the labyrinth. Thus Matte could completely deny the occurrence of deaf-mutism due solely to middle-ear disease.

Habermann reports two cases in which the middle ear only was demonstrable as a cause of the deaf-mutism. He gives the gross and microscopical pathology. In the first case, a boy thirteen years, who died of general tuberculosis, two different pathological changes were found. First, a recent tuberculosis of the middle ear, which had nothing to do with the deaf-mutism. Second, in both middle ears changes of a chronic nature, which could have existed for some years. In the right middle ear great thickening of the lining, numerous adhesions binding down the ossicles, a bony closure of the round-window niche, and hyperostosis of the bone on the inner tympanic wall. On the right drum a scar, and on the left an old perforation and calcification were present—effects of a suppurative otitis media. This middle-ear suppuration must have occurred early in the first weeks or months of the child's life. No pathological changes were found in the brain or nervous mechanism of the internal ear. The auditory canal was normal. For the explanation of the deaf-mutism only the changes in the middle ear remain. Panse, after a study of all the cases in literature in which pathological changes were found in the windows, came to the conclusion that diseases of both windows caused a considerable degree of deafness. Habermann reported a case, with specimen, to the Otological Society in Dresden, where both windows, right and left ears, were closed by bone and connective tissue, with complete deafness on one side and nearly complete deafness on the other. The bony closure of the round window and the fixation of the stapes by bands of connective tissue is sufficient therefore to explain the deafness in this case.

The second case, a woman, thirty-eight years old, died of interstitial nephritis. The pathological changes have a similarity to those of the first case, and are also to be interpreted as a result of a suppurative otitis media—a great thickening of the lining membrane of the middle ear; hyperostosis and sclerosis of the bone, and almost bony closure of the round window by bone tissue. The left drum showed a large old perforation; the right drum was thin. The pustule on the left drum is hard to make consistent with the rest of the aural conditions.

Bleb formation and small abscesses in the drum are not unusual in certain forms of inflammation of the external auditory canal as well as in acute suppuration of the middle ear, with copious exudation in the tympanum; but in a chronic suppurative case with minimum exudation and a large perforation of the drum the bleb cannot be explained. We can only regard the general condition of the patient to account for these changes in the ear. The patient had uræmia, with neuroretinitis, albuminuria, and enteritis. It is known that patients with kidney disease are much inclined to inflammatory tissue changes. Thus diseases of the skin in Bright's disease are not rare, and in the beginning, according to Thursfield, patients have pruritus, urticaria, and eczema. In the final stages, and in anæmic patients, erythema, bullous, and desquamative processes; further, purpura and pus infections.

In consequence of chronic suppuration pus cocci were already present, and the uræmia of the patient explains the appearance of the pustule in the epidermis of the drum.

The results of the hearing tests of this case are important. Unfortunately the tests were taken late, and the patient was very weak. A part of the investigation is unreliable. The patient had nearly complete deafness on the left; heard the watch by contact on the ear; heard numbers loudly spoken 0.03 m.; also on stopping both ears. Right: numbers; voice, 1.20 m., and numbers, whispered voice, 0.15 m. As to these results no doubt can exist, and the assertion is, therefore, correct that the patient still possessed this acuteness of hearing with bony closure of the round windows and free oval windows.

Other writers have come to the conclusion that bony closure of the round window alone does not cause deafness. Mygind reports a case of a deaf-mute child who had some hearing in spite of bony closure of the round window, with masses of cholesteatomata pressing through the oval window into the labyrinth. In the case described by me, could the objection be made that the window niches had not come to a complete bony closure, therefore, vibration of the membrane, at least of the posterior part, was yet possible? If we consider that the remaining space was not filled with air, but with a loose, wide-meshed connective tissue, and that these spaces were saturated with tissue fluids and completely closed off from the tympanic cavity by a new-formed thick bony wall, it is evident that a movement of the membrane outwardly by a movement of the labyrinthine fluid, due to the influence of sound, was impossible. This condition of the left ear makes it possible to consider the hearing acuteness of the right ear certain; then it is not a question of conduction from the nearly deaf left ear.

For good hearing the unhindered mobility of the membrane of the round window is necessary; that with bony closure of the round window one can even hear whispered speech close by; that with high degree of obstruction of the function of both windows speech-deafness had resulted in both ears in Case I. and in the left ear of Case II. From these cases and the case demonstrated in Dresden it is very apparent that under certain conditions deafness for the tuning fork by bone conduction can happen through complete closure of both windows.—"Zur Pathologie der Taubstummheit und der Fensternischen," *Archiv. für Ohrenh.*, 1901, Bd. liii., S. 52-67. Tafel I., II.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Retention of the Pupil Reflex to Light after Intracranial Division of the Optic Nerve.—MARENGHI (Pavia) before the International Congress of Pathologists at Turin (*British Medical Journal*, October 26, 1901), stated as the results of his experiments, and demonstrated to the congress in a rabbit, that the iris of an animal whose optic nerve was divided at its point of departure from the chiasm responded to light; the reaction was slow and weak, but distinct. The result could be explained by the existence of a peripheral reflex centre within the retina. Further investigation is needed.

Primary Chronic Glaucoma.—LITTLE, London (*British Medical Journal*, October 26, 1901), in his Presidential address before the Ophthalmological Society of the United Kingdom upon some clinical experiences of primary chronic glaucoma and the value of iridectomy, lays down the rule that an operation should be done in every case in which the patient is strong enough